LECTURES ON THE EXPLORATION AND TREATMENT OF DISEASES OF THE CHEST.

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LECTURE VII.—*Pleurisy.*

WE now come to the study of individual diseases of the chest. These may occur in the substance of the lungs and heart, or in their investing or lining membrane. The affections of the upper portion of the respiratory system are also closely connected with those of the thorax, and will require at least a passing notice.

Both lungs and heart offer an investing and a lining membrane, which are more frequently inflamed, or otherwise affected, in connection with the parenchyma, than separately. Nevertheless, these inflammations are sometimes met with in an isolated form, and it is then that they are most readily studied; afterwards the more frequent, but more complicated forms, may be analyzed, and you may separate the symptoms belonging to the different parts. The study of special diseases may begin with the inflammation of the serous or of the mucous membranes. In the present lecture I have determined upon deviating somewhat from the ordinary course, and shall commence the study by the examination of the serous membranes. These are the most simple of all the tissues composing the lungs, and the symptoms of many of their diseases are nearly as regular and readily learned as their pathological lesions. Still, in all such cases, you must beware of the difficulty into which an imperfect study of the subject may sometimes lead you; for in diseases of the chest, more than in any others, a partial analysis, and a limited diagnosis, may become the sources of error. You must prosecute your examination until you have arrived at the knowledge of all the symptoms; otherwise the physical signs may limit your views, instead of extending them, and you may rest satisfied with the discovery of a single disorder, instead of taking into your estimate the numerous diseases with which it may be complicated. This is a common error with those who are commencing the study of auscultation; they are apt to be too well satisfied with a partial discovery of the symptoms, and to forget that many other things may be concealed which a more thorough examination would explain.

Pleurisy, as you well know, is an inflammation of the serous membrane involving the lungs; it is very regular in its progress and symptoms. Like the other inflammations of this tissue, it is sometimes simple and readily diagnosticated, and at other times is singularly complex, or perhaps consecutive to other disorders of a different and more constitutional character. For example, it may be connected with tuberculous diseases in several ways: first, tubercle may be developed in the adherent and more cellular portion of the serous membrane, and the inflammation may directly coincide with this development; in these cases the tuberculous deposit is formed, as it were, by the same process as the inflammation, and apparently by the same action of the vessels. In other cases the pleurisy is consecutive to the tubercles already formed in the lungs; in a third variety the pleurisy may attack an individual in good health, and afterwards give rise to the tuberculous deposit, partly from the general shock given to the constitution, and partly from the determination of the diseased action towards the lungs. This latter variety usually occurs in persons of a tuberculous tendency; but it may also prove a purely accidental cause of tubercles, and take place in those whose constitution is not previously tainted by this diathesis. Pleurisy also occurs in a more acute form as a complication of affections of the parenchyma of the lungs, when the latter approach the surface of the organ invested by the pleura. Pneumonia is the disease of the lungs which most frequently gives rise to this form. There are some other lesions producing the same effect, which are, however, of rare occurrence, viz., gangrene and scirrhus: when these approach the surface of the lung, they cause inflammation of the serous membrane, with an effusion of lymph,—this inflammation being in almost all cases preservative, as the adhesion which

takes place prevents an effusion of the morbid matter into the cavity of the pleura.

We have, then, three principal varieties of pleurisy,—1st, simple pleurisy; 2dly, pleurisy complicated with a deposition of tubercular matter; 3dly, pleurisy complicated with acute lesion of the parenchyma of the lungs.

The pathological changes connected with ordinary pleurisy are regular in their progress, and proceed, step by step, with the symptoms, which afford us a means of measuring the intensity of the inflammation.

The first change which takes place is the injection of the membrane, connected with an enlargement of its vessels, which, in the natural state, do not transmit the red globules of the blood. These vessels are situated in the subjacent cellular tissue, and are disposed in an immense number of branches, which are interlocked in various directions, and form a complete net-work. In the midst of this, there are numerous bright red points, apparently formed by minute extravasations of blood from the vessels.

Almost simultaneous with this increase of vascularity is the development and effusion of lymph. This is at first deposited on the serous surface in minute points, which are scarcely visible, but may be readily detected by the touch. These points, as they become more numerous, gradually collect into groups, which, finally coalescing, form a continuous membrane. This deposit of lymph has received the name of a false membrane, and is more abundant at the lower portions, where it is in some cases as much as a fourth or even half of an inch in thickness, while at the upper portion it seldom exceeds the eighth of an inch. The character and amount of the effusion vary according to the form of the disease, and the constitution of the individual affected. In cases of local pleurisy, especially if occurring in robust persons, the amount of serum effused is very small, while there is a considerable deposit of lymph; the same also occurs in persons who are not robust when the inflammation is confined to a small portion of the membrane. On the contrary, if the patient be thin, and of a lymphatic temperament, and the inflammation diffused, the effusion of serum will be very great, with but a slight trace of lymph. The thin and serous part of the effusion tends to diffuse itself over the surface of the pleura, gravitating to the most dependent portion, and shifting its position with the movement of the patient. When, however, it is principally composed of lymph, it is confined to the part of the lung which is affected, and exhibits no such tendency. The serum increases in quantity as the disease advances, and decreases with its decline; but the lymph is more persistent in character, and, instead of being removed, becomes organized, and assumes the character of a serous or cellular membrane, according to the circumstances in which it is placed. When the inflammation continues for a considerable length of time, a secretion of pus takes place, and the serum is entirely replaced by purulent matter. The lymph in this case being bathed in pus, is modified in colour by its assuming a yellowish hue. When the serum is abundant, the lower portion of it is turbid, while the upper portion is clear. This results from the greater specific gravity of the lymph, in consequence of which it settles to the bottom of the fluid.

During the recovery of the patient, the following changes are observed to take place. As the serum is absorbed, the pressure of the atmosphere forces the parietes of the chest towards the lung, and adhesion takes place between the two surfaces of the pleura. As the lung is compressed against the spine, and in that position is covered with a coating of lymph, it remains permanently flattened, and cannot rise to meet the ribs. In those cases in which the pleurisy is slight, and the effusion very small, there is either no contraction of the chest, or it takes place to a very slight degree. The contraction is not entirely permanent; the lung after being compressed, does again expand to a certain extent, and rises partially towards its original form.

The adhesions become gradually organized during this process, and new vessels are formed in the lymph. The particles of blood are deposited in the lymph under form of dots, and gradually collect in trains or streaks; vessels are afterwards formed around the blood, which then finally inosculate with the original vessels of the subjacent serous tissue. The contraction of the chest is not great when the serum is but moderate in quantity; but in cases of abundant effusion, the contraction is equally well marked

with the previous distension. The alteration of conformation, therefore, is a purely pathological state, and corresponds accurately with the quantity of liquid exhaled. If, therefore, the effusion be limited, it does not produce a very decided dilatation or subsequent contraction: a less quantity than a pint is scarcely appreciable; a quart gives rise to a very decided alteration in the shape of the chest, and larger quantities distend it sufficiently to incline the body towards the sound side. In the same way, if the contraction which follows pleurisy be very great, the body is inclined towards the diseased side.

The nature of the liquid is not always the same; the greatest portion of it consists of serum in the early or inflammatory conditions of the disease. This is mingled with flocculi of lymph of various density, which seem to be detached from the surface of the pleura. In the chronic varieties of the disease, the liquid consists almost exclusively of purulent matter, although at first the serum is merely tinged with pus from a small admixture of globules with it; but as the disease continues, the purulent globules become gradually more and more abundant, until the liquid consists nearly of pure pus: the pleurisy is then often called empyema. It is in these cases that the distension of the chest is greatest. In the early stages of some cases, pus is mixed with the serum and lymph in small quantity, giving the liquid a slightly yellowish tinge; but, as a general rule, it is quite transparent, but of a light greenish yellow colour. In a few instances it coagulates spontaneously immediately after death, becoming a mass of tolerably dense albumen. In a number of cases it contains blood in small quantities, and occasionally, although rarely, the proportion of blood is large. These varieties in the exhaled fluid belong to the same disorder, which is in all these cases inflammatory; but the product varies according to the general condition of the individual's previous health, and other circumstances difficult to discover. In general, the product of inflammation of the pleura, and other serous membranes, is most consistent and most highly animalized when the patient is strongest, and the disease most violent.

These changes are very regular, and give rise to an equally regular succession in the physical signs. When the inflammation is severe, and the effusions very large, these signs are pathognomonic of the disease; but when it is small, the physical characters are so far useful, that they either confirm the indications of the functional signs, or prove that the disease is not advanced beyond a certain point. When the effusion of serum takes place, the sound on percussion is immediately dull, becoming gradually flat as the quantity of the liquid increases. The flatness is much more decided at the lower than at the upper portion of the chest, and becomes gradually less in ascending towards the summit; for the liquid of course gravitates towards the most depending portions. Still, the serous effusion is not the only cause of the flatness; it depends, in part, upon the thick deposits of lymph at the inferior portion of the lungs, and does not disappear entirely when the position of the patient is changed, although a change in the level of the liquid is always attended by a change in the degree of flatness. If the effusion be very large, the flatness gradually becomes more complete, and at the same time extends over the side of the chest, until the resonance is either completely lost, or is limited to a small portion of the chest near the spine, where the lung generally contains a little air. The increase in the flatness enables us to estimate the extent of the effusion with great accuracy; but the converse of this is not true in its declining stage,—for when the compression of the lung is carried to a great extent, it recovers its elasticity but slowly, and remains either permanently or for a long period in a more solid state than is natural; hence the clear sound returns slowly, and generally never recovers its original sonorousness. A moderate but diffused resonance does not, therefore, prove that the lung has not recovered from the inflammation.

The enlargement of the affected side accords with the dulness on percussion, and is always met with when the dull sound is at all decided. If, in the early stages of the pleurisy, you examine the lower and posterior parts of the chest, you will readily detect slight changes in the conformation; and this is then generally limited to an alteration of the natural convexity of the thorax, and is scarcely perceptible in the whole semi-circumference. The quantity of liquid which is sufficient to cause a decided change in the conformation, varies from a pint to several gallons. When it exceeds a gallon, the distension is of course very great. I have,

on one occasion, in which the bulging of the affected side was immense, found no less than five gallons in the right pleura. In these extreme cases the healthy lung is compressed towards the ribs, at the same time that the diseased one is forced against the spine, and death usually occurs from suffocation. The semi-circumference of the chest may be measured with a tape on a level with the sixth or seventh dorsal vertebra, in order to give you an idea of the changes which take place in the quantity of the liquid; but this method is of little use except in cases in which the effusion is very large. The position of the heart is another sign which is closely connected with the alteration in the conformation. If the pleurisy occur on the left side, the heart is sometimes forced to the right of the sternum; if, as is most frequent, the pleurisy attack the right side, the heart is removed towards the left axilla.

The respiration in the early stages of pleurisy is always feeble,—that is, if either the pain is tolerably acute, or the effusion at all considerable. But at the beginning, the feebleness depends much more upon the pain than the mechanical pressure of an effusion which is still quite small in quantity. When the dilatation of the vesicles in a part of the chest is attended with pain, that portion of the lung becomes to a great degree motionless, and remains so until the pain diminishes. This rule is so general in its application, that if the serous membranes of the chest be inflamed, in a great extent, and over both lungs, the patient may perish from the dyspnœa which arises from the inactivity of so large a portion of the pulmonary tissue. The feebleness of the respiration continues throughout the disease in those portions of the lungs in which the bronchial tubes are small; where they are much larger, the respiration becomes more or less bronchial, or at least rude. The intensity of the rude respiration varies very much, and chiefly according to the condensation of the lung; when this is very great, the bronchial respiration is very intense, sometimes quite as loud as in the most severe cases of pneumonia. The condensation of the substance of the lung is, therefore, a circumstance which favours the bronchial respiration. The density of the effused liquid is another cause of the loudness of the bronchial respiration; if there be a large proportion of lymph, or a thick, viscid liquid in place of the usual thin serum, the conducting power of the substance which intervenes between the tubes and your ear is increased, and the same result is produced as if the lung itself were inflamed.

When there is bronchial respiration in pleurisy, the resonance of the voice becomes bronchial, and you will observe a true bronchophony. This has, however, a peculiar vibration or quivering in its tone, which never exists to the same degree in pneumonia proper. If the bronchial respiration is not so loud, the resonance of the voice becomes less bronchial, but its vibration is increased, and its resonance is termed egophony. This takes place in those cases in which the effusion is but of moderate density, or little more thick than ordinary serum; and it is heard most distinctly from the anterior portion of the axilla to the scapula, and between this bone and the spine. It is therefore most evident when the bronchial tubes are moderately large, and there is a tolerably strong compression upon the vesicles. The depth of tone of egophony is modified by the density of the liquid more than its vibration; if the liquid remain thin, the egophony will continue; but in proportion as the density of the lung and of the effused fluid approaches more nearly to that of pneumonia, the resonance becomes more like bronchophony than egophony. When the egophony is perfectly pure, it is less loud, and often less easily recognised than in those cases in which the body of sound is decidedly increased by the hardness of the lung.

In certain cases of pleurisy there is little resonance and no vibration of the voice; this must depend upon the obstructions which prevent the passage of the air through the tubes, and of course destroy the resonance. It is difficult to state what these obstructions are; in some cases they may depend upon the pressure of the liquid upon the tubes, in such a manner as to interrupt the column of air, or upon accidental collections of liquid in them. If the lung remain soft and uncompressed, it will also give rise to an egophony which is but moderately loud; the circumstances, therefore, which favour its development, are moderate pressure and a little increase in the density of the tissue of the lung. If the voice be shrill and clear, it is of course much more decided.

The friction sound is another sign of pleurisy, which is much more irregular than the resonance

of the voice. It occurs under two different circumstances, at the beginning and towards the termination of the disease,—that is, at those times in which the effused matter consists almost exclusively of lymph, and not of serum; for if there be a large and thin effusion, the friction of the two surfaces of the pleura, which is the essential cause of this sound, will be prevented. When this sound occurs early in the disease, it of course takes place in the variety of pleurisy which may be termed dry, whether it continue in that stage or not; the friction is then very slight, and is unappreciable by many persons; it is more like the slight noise produced by rubbing together two pieces of tissue paper than any thing else. When it occurs at the close of the disease, after the absorption of the liquid, it is much louder, and then offers the peculiar character of the true friction sound. This is sometimes quite permanent, lasting several minutes, or even much longer. These irregular sounds are not of value for the proper diagnosis of pleurisy; they are only of accessary importance, and should be recollected by you, because every thing should be known which may become of use under any circumstances.

The signs of the lungs, properly speaking, are of great negative importance in the diagnosis of pleurisy. In fact, it is at times impossible to distinguish the cases in which the lung is unaffected, in any other way. If, therefore, you find no signs of pulmonary disease, such as are indicated by the rhonchi and respiration, you may regard the case as one of simple pleurisy. But, in order to form this opinion, you must take into your calculation both the general and local signs of pulmonary disease; and even then it will stand good only for the time, for you may be afterwards obliged to modify your opinion. Still, in simple pleurisy, you should recollect that there are no signs of disease of the lungs, other than those which arise from their consolidation by the pressure of the liquid. In practice, the complicated cases are probably quite as frequent as those which are more simple.

In the recovery from pleurisy, restoration to health takes place but slowly, and the lung does not recover its natural respiration for a considerable time; the sound remains feeble, and the percussion dull: after a very long period, sometimes a year or more, the restoration to the natural fulness and softness of the respiration may take place; but this is not to be anticipated in the great majority of cases, and we must therefore be satisfied with a slow and gradual improvement.

Besides the physical signs, there are other symptoms of pleurisy, which are, to a certain extent, quite conclusive. These are generally most decided in the commencing stages of the disease, and they may subside almost entirely, and be almost forgotten by the patient. The diagnosis of the disease is therefore easiest, by the general symptoms, at its very commencement, when the physical signs are most obscure. We are also obliged to rely chiefly upon the rational symptoms in those cases in which the adhesions between the two surfaces of the pleuræ are strong, and of course no effusion can take place; this is always the case in pleurisy which has succeeded to a former severe attack of the same disease.

Of these local, but at the same time functional signs, the most prominent is the pain. This is so acute in many cases of pleurisy, that the ideas of pain and pleurisy are very firmly associated in the minds of most persons, and they are apt to believe that all cases of pleurisy must be attended with pain: this is an error; for the pain may either be totally absent, or so obscure as scarcely to attract attention; it is then limited to a mere soreness along the portion of the chest most affected. When there is severe pain, it is almost always felt near the nipple; it is acute and lancinating, similar to that caused by the prick of some sharp instrument; hence it is in many languages called a stitch in the side. It is increased by motion, cough, or even respiration. When the inflammation is very sudden and extensive, the pain may be agonizing, and for a time effectually check the respiration. A large quantity of effused liquid rather diminishes than increases the pain; and when it becomes very large, as in very chronic cases, the pain is often limited to a mere soreness, which is often seated in the loins, instead of the thorax. This seems to depend upon the great weight of the thick purulent liquid. In diaphragmatic pleurisy, especially when caused by rheumatic or gouty disease, the pain is difficult to localize, and is generally wandering about the lower part of the thorax, causing more distress than other varieties of the dis-

ease.   You perceive, therefore, that the pain is an important symptom of the disease when it exists, but that it is never lasting in the slow and moderately severe cases of pleurisy, and may be either entirely absent or badly characterized throughout the disease.

The cough is another local symptom : this is generally present in the milder cases of the disease, and is always short and almost insignificant.   If the inflammation be very acute, the cough is almost entirely suppressed; and even in moderately severe cases, it is in a great degree checked by the aversion of the patient to make the strong respiratory movement necessary to produce a full cough.   It is not attended with expectoration in the simple inflammation of the pleura, for there is of course no secretion to be thrown off externally, unless the substance of the lung or the bronchial tubes are involved in the disease.   Hence many of the remarks which you will find in some of the older writers upon this subject, are in reality applicable to pneumonia, and not to pleurisy. The more chronic the disease becomes, the less disposition is usually felt to cough, and in cases of extensive empyema, there is often no cough.

The mode in which the respiration is performed is sometimes of importance ; in the beginning of the disease, when the pain is severe, the patient breathes chiefly with the healthy lung : this arises from the pain which is caused by the act of respiration, as well as coughing. When the disease is more advanced, the mechanical pressure upon the affected lung will prevent its expansion.   Hence the patient throughout the disease breathes chiefly by the healthy side.

The decubitus in pleurisy is sometimes of importance.   When there is pain, you may state, in general terms, that the patient does not lie upon the affected side, which is extremely sensitive to pressure.   Even late in the disease, he will prefer the sound side, or the back ; but when the effusion is so great that the weight of the liquid would press upon the mediastinum, and thus prevent the expansion of the healthy lung, he will naturally prefer lying upon the diseased side, and will thus relieve the lung which remains in a state fit for the performance of its proper functions.

The rational as well as physical signs which I have just described, are those which belong to pleurisy considered chiefly as a local affection.   There are many other symptoms which appertain to it in common with other inflammations of the serous tissues.   These phlegmasiæ present a number of characters similar to those of other inflammatory affections, and some that are nearly peculiar to themselves. In general, the serous tissues, like the rest of the body, modify the ordinary characters of inflammation, rather than offer others which are strictly novel.

At the commencement there is usually a chill, which varies in intensity from a slight sensation of coldness to a complete chill.   This is generally felt at the same time with the pain,—that is, the pain in the chest excites the chill ; it may return at several different times throughout the disease; but it then rarely offers the same intensity as on the first day.   The chill is followed, of course, by heat, and by sweating, which occurs at irregular times, and is never very copious.   During the disease the fever is generally persistent, and is characterized by a quick, tense, but rather small pulse.   This is often called the pulse of inflammation of the serous tissues ; although not regularly present in all cases of these diseases, it is found in a large proportion of them.   The sweats in pleurisy are sometimes extremely abundant, especially in the varieties of the disease that are complicated with a tuberculous development; but even in simple inflammation of the pleura they are sometimes extremely copious, and form a harassing and alarming symptom.   In empyema, the nature of the fever approaches the hectic type, and almost always assumes it when the operation of paracentesis has been performed, and a free communication is made between the external air and the purulent collection.   In the latent form of pleurisy the fever may be quite moderate, rather a slow febricula than a perfect fever, and this is one of the causes which render this form of the disease extremely obscure.

The secondary irritation and inflammation of other viscera, which are so frequent in the inflammations of the mucous membranes and the parenchymatous organs, are very slight in pleurisy and serous inflammations in general. The disturbance of the alimentary canal is strictly proportioned to the intensity of the fever, and not to the gravity of the inflammation, which pursues a course almost unconnected

with the other viscera. The strength and the cerebral functions are usually just so far affected, as naturally results from the severity of the pain and degree of the fever; they are, in themselves, very little disturbed by the inflamed pleura. Hence pleurisy is a remarkably simple disease, if it be the primary affection; it forms itself the complication, but has little power to give rise to disorder of other tissues. This is explicable enough when you reflect upon the simple structure and few nervous relations of the serous tissues. There is, however, one exception, the tuberculous diseases, whose development is sometimes singularly favoured by pleurisy.

The diagnosis of pleurisy is readily enough made in most instances: a well characterized case is always certainly known, and can be confounded with no other affection. That is, when the distension of the chest, the dulness on percussion, and feeble or bronchial respiration, coincide with dyspnœa, pain, and fever. If you restrict your diagnosis to the functional signs, you will, of course, be somewhat puzzled in many cases: with the aid of the physical signs, all decided cases can be mistaken for nothing else. In the slighter cases, where there is little or no physical change, this is not always the case: pleurisy may be confounded with pleurodynia, or simple rheumatic pain in the intercostal muscles and the adjacent fibrous tissues. The fever is a very uncertain test; but it has a collateral value, for it is more apt to accompany true pleurisy than simple pleurodynia. The nature of the pain is a better one; for, in pleurisy, this is, to a certain degree, limited, and almost always is found about the anterior margin of the axilla; but in pleurodynia it shifts about, and is often found on both sides at once; very frequently it disappears for a time, but soon returns, displaying in this respect the peculiar changeable character of rheumatic disease. When the pain occurs during the course of inflammatory rheumatism, you need not trouble yourselves about the diagnosis,—for in such cases there is almost always something more than a mere rheumatic pain, and the pleura is positively, though perhaps slightly, inflamed. As a general rule, therefore, if in your suspected pleurisy the pain is at all constant, you may regard it as a true inflammation. The mobility of the pain is therefore the only good proof of pleurodynia. There

is no difficulty in distinguishing between simple pleurisy and pneumonia, or other diseases of the parenchyma of the lungs, with pleuritic complications; for the signs of true pulmonary disease are of course wanting in the one case, but present in the other. The inflammation of the pericardium frequently occurs in connection with pleurisy of the left side, when it is sometimes extremely difficult to recognise it; for the signs of one disease, to a great extent, obscure those of the other. If the pleurisy attack the right side, the distinctive characters of the two diseases are quite evident.

In simple pleurisy your prognosis is almost always favourable if you see the patient rather early in the disease; if the effusion is very large, or if the disease be chronic, it is then quite doubtful: the mortality is totally different under these circumstances. In the secondary pleurisy, or in that variety which is accompanied by tuberculous disease, the prognosis is of course much less favourable. When it precedes tubercles, it usually ends in recovery, but afterwards gives rise to them.

The treatment of ordinary pleurisy is based upon well established grounds,—that is, of the disease as distinguished from those cases in which pneumonia plays the most important part. It is strictly antiphlogistic,—and, as in other inflammations of the serous membranes near the surface of the body, is most effectual when you use local depletion in combination with or in addition to general blood-letting. The latter remedy, however, is always productive of great relief in the cases which begin with strong inflammatory symptoms,—that is, much pain and dyspnœa; there is, then, no substitute for it. After you have taken a moderate quantity of blood, however, and have relieved the pressing symptoms, the indications are then rather to continue the treatment by local depletion and by diaphoretics than repeated general bleeding. Cupping or leeching to the painful parts, repeated if necessary, two or three times, is then the best remedy. The effects of local bleeding are much more prompt in serous than in mucous inflammations, or in diseases of the parenchyma of organs. They may be repeatedly applied in either acute or chronic cases; but you will gain most from them if you choose the moment when the pain is most acute; it will then often yield very quickly, and the disease improve after free local bleeding.

There are several other local remedies which are effectual in relieving the pain and inflammation besides cupping and leeching; these are warm poultices of hops, sprinkled with a teaspoonful or two of laudanum, and kept warm by placing over them a bottle or tin vessel filled with hot water, which should lie on the bed by the side of the patient. The narcotic acts with considerable energy upon the part, and its action is favoured by the warmth and moisture. In slight pleuritic pains, as well as in the true pleurodynia, sinapisms are eminently useful; but they are of little benefit in severe pleurisy. This is not the case with blisters, which belong to that established class of remedies whose virtues have been tested by the experience of many generations; they are used with two objects in view—to relieve the inflammation, and to favour the absorption: hence they are particularly applicable to those cases in which there is much effusion, both in the acute and chronic diseases; while the inflammation is still advancing, the operation of blisters is uncertain, and sometimes seems to be positively injurious; but after the active inflammatory symptoms have been checked, they are productive of decided benefit, and are, perhaps, of all remedies, those whose action is most unquestionable, as the acute pain often subsides immediately after vesication, and the absorption of the effused liquid sometimes takes place very rapidly. The rapidity of absorption is not generally proportioned to the quantity of the serous secretion from the blister, although in a few cases a very copious discharge will pour from the vesicated surface, and the pleuritic effusion will disappear in a few hours. In chronic cases of pleurisy, blisters are amongst our most valuable remedies; but they should be small, and very frequently repeated. My own plan is not to make them larger than two or three inches square, and to apply them every two or three days, dressing the surfaces with simple cerate; you should, in this way, pass over a considerable part of the affected side by applying these small blisters successively to different parts of it.

When the pleurisy has been entirely or nearly removed, the patient often complains of slight returns of the pain from exposure to damp, or to a cold wind. The only way of guarding against these slight returns of the inflammation is to cover the affected side with a Burgundy pitch plaster, and to direct your patient to clothe himself warmly.

These, then, are the directly depletory remedies, and such as act as local counter-irritants. The internal remedies suited for the treatment of pleurisy are numerous, and applicable either to different cases of the disease, or different stages of the same affection. They may be divided into three principal classes :—1st. The antiphlogistic remedies, which are intended to relieve the inflammation, and check the fever. 2d. The remedies that promote absorption, which, however, are often fitted at the same time to check the inflammation. 3d. The anodyne, which may relieve the pain. Of course, in a strictly inflammatory disease, the first class of remedies, and those which belong both to the first and second classes, are the most important. The tartarized antimony has long been used both in simple pleurisy, and in the disease complicated with pneumonia; it is usually given as a diaphoretic, in the doses of a fourth to the eighth of a grain,—rarely in larger doses. In these doses its nauseating influence is but slight. In the early stages of pleurisy, free diaphoresis is a powerful therapeutic agent,— but in the more advanced cases, sweating is productive of comparatively little benefit: its good effects seem to be limited to those stages of the disease in which resolution is practicable before there is much effusion into the pleura; that is, it is a means of depletion from the vessels, and exercises comparatively little influence in promoting absorption. In chronic cases of pleurisy the tartar emetic should either be given up altogether, or restricted to very minute or merely alterative doses.

The tartar emetic is almost the only remedy which is nearly exclusively antiphlogistic in its action; most other internal remedies are more powerful from a combined action in promoting absorption, and checking inflammation. The most important are mercury, nitre, and digitalis; squill and colchicum are also powerful remedies, and act like most other diuretics of a moderately stimulating character. Of these the most important is mercury. Mercury, given in moderate doses, so as not to disorder the bowels, produces two distinct effects; one is directly antiphlogistic, the other is the influence which it exerts upon secretion and absorption. In the treatment of pleurisy in its active inflammatory stage, the first action of

mercury is that which is most beneficial; in the advanced cases of purulent effusions, the inflammatory character of the disease is less marked, and the action of the mercury is chiefly limited to the absorption and elimination of the effused matter from the body. In the more acute cases you may give mercury more rapidly, in chronic cases more slowly. Thus, I would advise a quarter of a grain to half a grain of calomel to be given every four hours, if you design it as an antiphlogistic; it will then produce its specific effect in a short time, and the disease will generally decline. The mercurial treatment is of course but a sorry substitute for bloodletting, which it should follow and assist, but not replace. If the mercury be used towards the decline, or in the advanced periods of the disease, when your object is more to promote absorption than to remove the inflammation, you should give the calomel in much smaller doses, as an eighth or a sixth of a grain three or four times a day: this operates but slowly, and is much more effectual in increasing the power of other alteratives than larger quantities.

The mercurials are usually combined with other remedies, which will work, as it were, in the same direction with them. Thus, in the early stages of the disease, Dover's powder, or the simple opium and ipecacuanha, may be given with them: if full diaphoresis is brought about by these means, the disease is more easily subdued. In the advanced stages, digitalis, and nitre, act admirably as diuretics. There are cases in which others of a more stimulating kind, as the juniper berries, or spirit of nitre, come in well; but these are chiefly such cases as approach very nearly to hydrothorax: there is then a feeble condition of the economy, and but little active inflammation.

The diaphoretics of a vegetable kind are, like many other remedies, adapted for various stages of pleurisy. In the early stages, full diaphoresis acts admirably as an antiphlogistic remedy, while in the advanced stages it may increase absorption, and remove the effused fluid. The latter effect is, however, very uncertain; for the disease naturally tends to produce sweating, and the perspiration seems an abortive attempt on the part of nature to throw off the disorder,—the curative action being quite disproportioned to the diseased one.

Anodyne remedies in the treatment of simple pleurisy, are merely palliative, and are, therefore, rarely given alone. They consist almost entirely of some form of opium, except in those cases in which the patient is unable to take any preparation of this drug: we are then compelled to resort to various substitutes. You must not, however, suppose that opium is insignificant, or of no value, because it is simply a palliative; for in pleurisy, as in other inflammations, the relief of pain prevents the increase of the disease, and is one of the most effectual aids towards its cure. The only objections to its employment are to be found in those cases in which the cure takes place chiefly by secretions which must be thrown off from the body: this is not the case in inflammation of the serous tissues, in which the liquid is necessarily retained until it can be removed by absorption and the adhesion of the coagulable lymph. There is, then, no permanent therapeutic contra-indication to the use of opiates: if the skin be dry, they should be given in the form of Dover's powders, from eight to twelve grains of which may be given in divided doses during the day. If the sweating be copious, morphine will, as a general rule, be the best remedy, administered chiefly at night, in the ordinary doses of an eighth to a quarter of a grain. This is sometimes necessary for a considerable period.

When you find the pleurisy nearly well, but the patient still complaining of some dyspnœa, or a little feverishness, and you discover, on examination, that a portion of the liquid remains unabsorbed, nothing is so efficacious as a journey, with its necessary consequence, change of air. Although the sea-air is not always adapted to pectoral diseases, it is often of decided advantage in chronic pleurisy, especially if combined with a voyage. But a course of this kind is necessarily attended with no little expense and inconvenience, and is totally beyond the reach of many of your patients: you will be obliged to resort more frequently to land journeys, as a less troublesome and sometimes as efficient a course. This is generally the surest means of dissipating the remains of the disease, and insuring a restoration to entire health. Of course, the usual hygienic precautions as to dress, should be adhered to.

There is no disease in which the treatment is more influenced by a knowledge of its symp-

toms and pathological relations than pleurisy; for, simple as it is, the success, in chronic cases, depends chiefly upon steadily watching the physical condition of the chest, and persevering in your care until the disease is entirely dissipated.

FOREIGN.

ANDRAL'S LECTURES ON THE ALTERATIONS OF THE BLOOD. NO. II.

Disorders produced by Anemia in the functions of Nutrition.

Digestion.—The process of chymification in a healthy man is arrested by a blood-letting. Digestion is deranged in those affected with anemia; they are subject to nausea, vomiting, dyspepsia, &c. Exhalations of gas are frequently met with in this affection, as well as in hysteria.

Circulation.—Syncope; palpitations of the heart, with acceleration of the strokes of the pulse; action of the heart irregular, tumultuous. Bruit-de-diable in the carotids is one of the best distinguishing characters of anemia, or chlorosis. This sound is not found in the heart. If the bellows sound exists in the heart, at the same time that it is found in the carotids, it does not furnish us with a pathognomonic symptom of chlorosis, as, in this instance, it depends upon disease of the heart.

The capillary vessels are subject to passive congestions. In animals destroyed by anemia, we find the conjunctiva of a bright red colour. Amaurosis following anemia, is accompanied with injection of the conjunctiva, hæmorrhages of the capillary vessels, epistaxis. These hæmorrhages cannot be combated by antiphlogistic remedies.

Respiration.—Panting, dyspnœa. Auscultation sometimes gives us no results; at other times we discover pulmonary congestions, or œdema of the lungs, which are attended with a crepitus. Sanguineous congestions are produced in animals by anemia, or the loss of blood.

Secretions.—Urine pale, transparent, very watery.

Saliva.—The mouth often presents a dryness which might lead us to attribute it to an irritation of the stomach; but such is not the case.

Perspiration.—By bleeding a man, we make him perspire: in persons suffering from anemia, sweating is brought on by very slight causes. The exhalations from the serous surfaces are frequently increased, and dropsies are the consequence. Anasarca is often produced in children after losses of blood, or chronic diseases. During a famine which prevailed in France, dropsy appeared in an epidemic form. Whenever the blood becomes impoverished, serous effusions show themselves; the blood being deteriorated, and the solids not receiving blood capable of repairing their losses, we should expect to find all the tissues of the body atrophied; but we do not find this to take place, except in the muscular system, whose nutrition is impaired, while that of the brain, liver, skin, &c., do not seem to suffer. The transparent cornea gives way in animals who have suffered great loss of blood. Anemia is favourable to the development of tubercles.

Anemia is chronic or acute. When spontaneous it is generally chronic; beginning with derangement of some of the functions either of digestion or the nervous system, with intermissions; the patient being one day better, another worse. Acute anemia resembles a disease in progress. [Case: A. B. had headach; palpitations of heart; debility; chlorotic tint; vertigo; pulse 120; frequent faintings; appearance of fever towards night; with symptoms resembling a cerebral affection, for which this case was mistaken, and treated by blood-letting, during which syncope came on. When he was put upon large doses of iron, he was speedily cured.]

Anemia may end in health or death. Simple anemia may be fatal from the impoverishment of the blood, and death may take place during the debilitated state, attended by symptoms of nervous disorder, or pulmonary congestion.

2. *Alterations of the Blood as to quality.*

Alterations in its chemical or physical constitution may exist, which are inappreciable to all our means of research.

Some of the alterations of its physical qualities may be detected by the sight, &c., without the aid of instruments; others are only discoverable through the aid of the microscope.

First Section.—Physical alterations appreciable to our Senses.

Colour.—Its dark colour may become lighter, on account of its deficiency of colouring matter, as is seen in lymphatic and chlorotic persons. Venous blood may assume a redder tint, and be mistaken for arterial. After blood-letting, or large loss of blood, the last that flows is of a brighter hue. In different periods of disease this florid blood is seen, and it has been attributed to the arterial blood passing rapidly through the parenchyma, without undergoing any change, or divesting itself of its principles for the purposes of nutrition, which latter function is found to be considerably impaired. Stevens attributes the changes in the blood to the different proportions in which the neutral salts which it contains, may exist; Rossi, to the influence of electricity.

Influence of the Section of the Nerves on the coloration of the Blood.—Several theories.

The venous blood may assume a darker hue, and become as black as ink. The venous blood has undergone this change by the introduction of a poison, such as the miasmata of typhus, &c. In some epidemics, according to Stevens, the blood presented that dark or black

colour in persons in whom the epidemic disease had not as yet shown any of its symptoms; and according to the same author, this blood, on exposure to the air, did not become red. In the cholera the blood was black; in scorbutic patients, the blood is found of a darker hue. The blood may become yellow, and more especially its serum, without its containing any bile; animals stung by scorpions exhibit this appearance. If the blood becomes green by the addition of nitric acid, bile is present. The blood has sometimes presented a white or milky colour, or merely contained streaks of white, which were supposed to be derived from the presence of chyle or milk; but this whitish colour is produced by a greasy matter, described by Chevreul.

The buffy coat differs in colour from the crassamentum. It varies in thickness from one to nine lines, and is modified by the vessel which receives it. When thin, it may be florid or greenish; when thick, white or yellowish. Its consistence does not depend upon its thickness. When soft on its surface, it frequently contains mucus; when well formed, the crassamentum on which it rests is very soft; may be partial or general, or cellular; as large as the crassamentum, or greater or less in size. Its shape may be flat, like the crassamentum, or it may be hollowed in the centre, and raised at the edges (cupped); may be perfect or imperfect. The appearance of the buffy coat, when perfect, is of importance; but when imperfect, much value should not be attached to it, as it is met with in many dissimilar diseases. The buffy coat is composed of the fibrine, sometimes containing in its meshes serum and albumen; and on its surface is sometimes found a softish substance, which appears to be altered albumen.

The buffy coat, in its formation, is influenced by certain physical causes. Blood drawn from a vein will present a buffy coat, while the same, drawn, by cupping, from the capillary vessels, will not present a trace of it. According to the different forms of the vessels into which it is received, it will be present or wanting; that drawn from a small orifice will not present it, and, if allowed to trickle down the arm, the same results will happen; though this rule does not hold good in all cases. If the bleeding be interrupted by a state of syncope, that which flows after the syncope will not be buffed. If the blood be well shaken it will prevent its buffing; and the same will happen if it be allowed to fall down from a height. If received into vessels which are large and flat, the buffy coat is with difficulty formed; whereas, conical and narrow vessels favour greatly its formation.

Influence of diseases on the formation of the buffy coat.

If the character or disposition of the disease hinder or is unfavourable to its formation, we cannot promote it by any physical influences; and in those cases where there is a disposition to its formation, it will make its appearance although opposed by the same influences.

The importance of the buffy coat has been admitted by some, and denied by others. Both these sects are in error. The buffy coat does not always imply the existence of an inflammatory state.

I have preserved notes of 1494 cases in which bleeding had been practised, the blood having been drawn from orifices of the ordinary size, and been received into vessels of the same size and shape. The following are the results:—

Perfect buffy coat, in 643 of these cases.
Imperfect do. ,, 183 ,, ,,
No appearance of do. ,, 668 ,, ,,

The buffy coat may be absent in all the different varieties of diseases. In its perfect form it is most frequently met with in the following cases:—

Acute articular rheum. in 4-5ths of cases.
,, pneumonia, ,, ,, ,,
,, pleurisy, ,, ,, ,,
Pulmonary tubercles, ,, ,, ,,
Acute metro-peritonitis, ,, ,, ,,

In the first stage of pulmonary tuberculisation, the blood does not present this coat, but, as the stages of this disease are more advanced, it becomes more frequent; and when caverns have been formed, the buffy coat is as often met with as in pneumonia, but its thickness is less. Next in order to these diseases comes erysipelas of the face, in which the buffy coat is found perfect in three-fifths of the cases; imperfect in one-fifth; and absent in one-fifth. In angina and amygdalitis, it is found perfect in one-half of the cases only. Taking peritonitis and nephritis together, it is as constant in them as in pneumonia. In painter's colic, it occurs in one-third of the cases; and in pulmonary emphysema and ophthalmia it is found in the same proportions.

Bronchitis, even when capillary, does not exhibit it in more than one-fourth of the cases, and the same proportion answers for gastro-enteritis and chronic rheumatism. In effusions into the pleura after fever, in intermittent fevers, organic affections of the heart, and cerebral congestions, it occurs in the proportion of one-sixth of the cases. In cerebral and uterine affections, in one-seventh, and in lumbago, in one-tenth of the cases. In the latter affection, the imperfect one is more frequent than the perfect one, and shows itself in one-third of the cases. In the cholera, the buffy coat was absent when advanced to the period of cyanosis. In hysteria, sciatica, pleurodynia, simple jaundice, it was either imperfect or absent; and not met with in neurosis, mental alienations, chorea, delirium tremens, saturnine epilepsy, facial neuralgia, simple or mercurial erythismus, scurvy, &c.

I have not many cases of scarlatina, measles,

or small-pox, in which I have employed bleeding. In scarlatina I have never seen the blood with a perfect buffy coat, but frequently with an imperfect one; in measles, very seldom; and in small-pox I have found the buffy coat as the general rule, and I would place it in frequency after pneumonia, but my data are not sufficiently numerous, and the appearances differ according to the stages of the disease.

In speaking of small-pox we must consider three circumstances: first, whether there be a complication of pneumonia or of pus in the blood; second, whether the eruption be distinct or confluent, (all those cases in which the buffy coat was well developed, were of a confluent character;) third, period of the disease: before the appearance of the eruption, I found, as in typhus fever, no buffy coat; but I must say that I have bled but in a very small number of cases. After the appearance of the eruption, from the second to the fith day, I have found a firm and thick buffy coat, similar to that of acute rheumatism. At the period when the pustules become filled with pus, and when the fever of suppuration is established, the buffy coat still showed itself, but becoming soft, thin, and imperfect, and covered with a kind of infiltrated mucus.

The buffy coat is imperfect or absent in epistaxis, blenorrhagia, systitis, erythema, urticaria, and venereal buboes. I have never found it perfect in any of these diseases.

In chlorosis of a pure, simple, uncomplicated character, I have bled three times. In the first case I found the blood presenting a perfect buffy coat, thick, firm, consistent, with elevated edges, and, in this case, there was no fever—the crassamentum was small, with a large proportion of serum. In the second case the blood was imperfectly buffed, and, in the third case, was not so at all. In another case of chlorosis, complicated with acute articular rheumatism, the blood was covered with a perfect coat.

It has been asserted that the blood drawn from a horse is always buffed and cupped; but that drawn from a healthy man is not so. De Haen and Boreski did not attach any importance to this coat, and denied its value. Authors often confound the part of the blood which becomes oxygenated with the buffy coat. Thomasini attaches great importance to this appearance of the blood being buffed; and says it is to be met with in a circumscribed phlegmasia, or one of a general character, or in a phlogistic diathesis, such as is presented by a pregnant woman. He considers chlorosis as a phlogosis of the blood-vessels.

The blood may be buffed in all diseases; its value depends upon the proportion in which it is found in such diseases, and depends more upon a certain condition of the blood than upon any particular disease. This condition of the blood may be met with in different diseases, and may thus explain its appearances in such and such cases. I merely give this explanation, without attaching much value to it.

Influence of the febrile state upon the presence or absence of the buffy coat.

Fever alone will not produce it—witness typhus; however, we generally find fever accompanying its presence; for it does not exist in acute articular rheumatism unless fever be present. Plethora alone will not produce it. The constitution has no influence over its production. Does the complex phenomenon called inflammation, possess any influence over its formation? Those diseases which present the best-marked symptoms of inflammation are also those in which it is found most perfect. Its existence alone will not reveal the nature of the disease; and its presence does not furnish a reason for bleeding; for in phthisis it is always to be met with. In acute articular rheumatism, after twenty blood-lettings, it will still be found as long as the intensity of the disease lasts, and although the crassamentum of the blood becomes less.

The mechanism of the formation of the buffy coat is wrapped in the same mystery as the cause which produces it. Its formation is prevented, or with difficulty effected when the blood coagulates too fast. If the blood does not coagulate, it will not be produced, and it is not necessary for its formation that the same condition of the blood should always exist. It may be formed under different conditions of the blood.

Theory of its formation.—The quantity of fibrine in the blood is increased, and, if the coagulation takes place slowly, the fibrine becomes completely separated, and, its specific gravity being less than that of the globules, it floats on the top, forming there the buffy coat. M. Denis describes fibrine as a modification of albumen. The buffy coat is composed of a portion of the fibrine which separates from the globules. Why and by what means produced? We can give no answer.

Alterations of the Odour of the Blood.

Morton describes a patient whose blood was stinking. Morgagni relates cases where it presented an acid odour. Stevens detects the yellow fever by the odour of the blood. I have never been able to discover any smell in the blood of small-pox or typhus patients. Poisonous substances might communicate their odour to the blood as they are carried along with it.

Alterations of the Taste of Blood.

In the cholera the blood becomes insipid. The ancients said that, in Rachitis, it was acid.

Heat of the Blood.

In some diseases the temperature becomes elevated in several degrees, and it remains still to be seen whether the blood partakes in this elevation of temperature. It was asserted that, in the cholera, its heat fell three or four degrees, and in the cold stages of inter-

mittent fever, this lowering of the temperature had been noticed. I deny this fact; for I have seen, in the cold stage, the thermometer indicating a temperature equal to and even above the natural standard of a healthy man. In hysteria, where the nervous system is so much disturbed, we might expect to find the heat of the blood decreased. Morgagni relates a case of a young hysterical woman, from whom the blood drawn was cold. I am not aware of any authenticated case in medicine, in which the temperature of the blood was increased.

Electricity of the Blood.

According to Bellingheri, in what he calls inflammatory diseases, the blood drawn from a patient is deficient in electricity; and, according as the symptoms of inflammation are on the increase, the electricity of the blood decreases, and *vice versâ*. The electricity would be negative when the blood was flowing and was buffed, and would be less than in the healthy fluid. When the electricity was in great quantity, there would be no buffy coat; its electricity would be greater at the beginning than at the close of a bleeding; but on all those subjects science is still in its infancy.

Alterations in its Consistence.

Its consistence may increase to the extent either of becoming thicker or of becoming solid. It may be diminished, becoming very liquid, not forming any clot, when drawn from the body, or when found in the dead subject.

Augmentation of its Consistence.

The doctrine of Boerhaave was based upon the thickness of the blood, which, according to him, was such as to prevent its molecules from passing through the minute capillary vessels; thus producing a congestion, depending either upon this thickened condition or upon some change in other respects. In fevers, the blood becomes thickened by the escape of the liquid or watery parts, and by the increased temperature. Hoffman considered these obstructions produced by the thickened state of the blood, as giving rise to fever, and the conversion of the blood into pus. All those opinions are merely theoretic, being unsupported by proofs, and were upset by the solidists. At present those ideas are again brought forward; and Magendie has experimented on this subject. Substances which, mixed with blood, thicken it—such as oil, grease, &c.—were introduced into the veins of animals who died with either symptoms of pulmonary affections, or death was produced slowly by other causes. On examination, he found congestions and extravasations of blood—engorgements resembling pneumonia in its first or second stages. Such occurrences may be explained by supposing these foreign substances incapable of passing through the lungs, and thus producing congestions. If charcoal be injected into the veins of an animal, he recovers from its effects, as the molecules of the charcoal, reduced to an impalpable power, are smaller and mingle with the blood without thickening it. The blood may thicken spontaneously, and, by analogy, we may believe that it may become so to such degree as will prevent its passage through the vessels, and congestions thus be formed: experience, however, does not prove this. In one case, by the aid of the microscope, was seen a portion of blood thickened, endeavouring to pass through, and stopped before the capillary vessels, until propelled through them by a violent contraction of the heart produced by the agitation of the animal. I am of opinion that a great number of inflammatory congestions may be accounted for by the thickened condition of the blood rendered thus incapable of passing through the smaller vessels: this opinion may, perhaps, one day be borne out by future researches.

Boerhaave thought that some kinds of food thickened the blood; and he is supported in this theory by some facts in physiology—as such a food producing a milky chyle, and another kind furnishing one of a different character. May these different chyles produce differences in the blood? We know not. Many diseases seem to be cured by diluting the blood by means of drinks. Some skin diseases are thus removed. Water injected into the current of the blood separates itself, passing off either by absorption or through the kidneys. Water given to a sick person passes off by excretion, it being very difficult to dilute the blood, as this fluid, by a law of its own, endeavours to repel it: the blood is naturally viscous; its viscosity increases with the augmentation of its consistency. In the cholera its viscosity was increased, and the water of the serum diminished. The greater viscosity of the blood in inflammation has been attributed to the large quantity of albumen which it contains. The serum may become viscous, or its viscosity may diminish.

Coagulation of the blood during life time.

We find clots in the heart, if we open the body fifteen hours after death, before putrefaction has commenced. In animals, we find them one hour after death; if we delay till twenty-four hours have elapsed, our chances of finding them are lessened, as the blood liquifies when putrefaction sets in. There are some cases in which the clots found after death have been formed during life time—can we detect their formation in the living subject? The clots differ much from each other, and are found red, white, red externally, white internally, or white externally and red internally, or striated with red and white; these streaks have been taken for vessels, which is erroneous. Their consistence may be firm or soft, dry or infiltrated, and easily torn; their size may be large, occupying all the heart, and branching into the arteries and veins. The clots formed after death may contract from adhesions with the walls of the heart internally. In the hearts of animals examined just after death, no clots are

found; but in a few hours after, we find them formed and adhering to the walls; around the clot is found a pellicle resembling a membrane, and which may easily be mistaken for a false one, although it is merely a physical phenomenon, resembling the perfect buffy coat. Some clots are formed in the heart during life time—are their characters similar to those formed after death? We can distinguish them by certain signs—but are those signs well marked? They are not; the physical peculiarities are not sure enough. If the clots do not present characters which serve to distinguish them from those which are found in almost all the hearts which we examine after death, I cannot place reliance upon the diagnosis which pretends to ascertain their presence during life. How can the blood, so agitated as it is in the heart, coagulate during life time?

The friability of these clots, and their gray colour, have been given as proofs of their being found during life: at the summit of the valves, when they are disorganized and rough, we find polypi which appear composed of several layers, and presenting a degree of organization. The best signs of their formation during life, are their being organized in their centres; but this we find very rarely.

I have injected the clots found in the heart, by the coronary arteries, and their being thus injected was considered as proving the existence of vessels in them; but I do not look upon it as such a certain sign. The existence of pus in their centre, was advanced as another such proof; but has it been secreted there? Before we can admit it, we must allow the organization, the inflammation, and the power of secretion of the clot, which is far from being proved; for it may be formed by the endocarde in a state of disease, or carried into the heart with the blood, and at death has become separated from it, and afterwards surrounded or inclosed by it during its coagulation. I have never found pus in a clot which I could assure myself had been secreted there: clots may form during life in those cases which present some alteration of the lining membrane, a molecule of blood attaching itself to some part of its altered surface, and there showing a tendency to conglomerate; this disposition may be increased by a condition of too great viscosity of the blood, and they have been found when the smoothness of the lining membrane has been altered.

The alteration which we now describe under the name of dissolution of the blood, formerly was called putridity. It may exist in different degrees: in the one, the clot, although distinct from the serum, is so soft as to be readily broken down, and mixes freely with the serum under a slight touch of the finger; in the other, the clot is absent, and a reddish liquid is found, with grumous masses floating about in the reddened serum. We must not confound the dissolution of the blood where the solid parts of that fluid remain uncoagulated, with that condition in which the coagulable principles of the blood are absent entirely or in part, producing a clot of small dimensions floating in a large proportion of serum: in the state of dissolution, the solid parts of the blood merely form grumous masses mixed and confounded with the serum.

This condition of the blood may exist in different classes of cases: in one variety, the cause which produces it is evident, as when a concentrated solution of sub-carbonate of soda was injected into the veins of an animal, by Magendie; the blood was changed into a liquid of a reddish colour, containing portions of fibrine separated into grumous parcels. Does the blood become more alkaline where this state of dissolution exists? the following facts have been given as proofs. In blood of a scorbutic patient, which was not coagulated, there existed a larger proportion of soda than natural. In a very severe case of typhus fever, Denys detected the presence of free ammonia and of an ammoniacal salt.

Bretonneau describes mercury as producing a dissolution, but this is not proved, and the same effect is caused, according to Grange, by the exhibition of resinous purgatives, cicuta, and laurel water. The sulphuric, nitric, and prussic acids, mixed with the blood in vessels, dissolve it; also some gases, as the sulphuretted hydrogen.

Influence of pus.—It has been said to coagulate the blood which is found in an inflamed vein; it varies in its properties, being either acid or alkaline, sour or sweet, forming a bloody liquid or a thick one—and according to these different conditions it may produce corresponding effects: blood is not changed by the mixture of a laudable pus, but if mixed with serous pus, it is dissolved, and is prevented from coagulating. In some cases of resorption of pus, I have found the blood in a state of dissolution in the heart and blood-vessels; in other cases I have found clots in the heart, &c. Gaspard has dissolved the blood by injecting putrid matter into the veins: can this condition be produced by the introduction into the blood of imperceptible miasmata, and is it owing to their pressure that the blood in the plague and cholera is found dissolved? Do the pernicious intermittent fevers depend upon this altered condition of this fluid? The state of the blood in these latter diseases has not been ascertained.

Millman says, that in scurvy the blood is not changed; in the great majority of cases it is found dissolved. According to L'Inde, the blood is not changed in the first stage of this disease, but as it advances in its progress it becomes more and more altered until it becomes entirely changed into a reddish fluid. I am of opinion that miasmata are injurious by producing certain changes in the blood, which are

not discoverable in the first days of the diseases.

Viruses.—In small-pox, the blood has sometimes presented an imperfect buffy coat, and in the severe forms of it, it has been found dissolved. Is this owing to the presence of pus? The hydrophobic virus has been mentioned as producing the dissolution of it: I cannot give any opinion on this subject. Can it be produced by the food employed? I think, that an insufficiency of aliment, combined with bad air, may produce the scurvy: a humid atmosphere has been mentioned as a cause of the dissolution of the blood, which state, however, must be distinguished from its mere liquidity. The blood may exert influence over the nervous system, which may be differently excited by it, according to its various morbid conditions: this is a very serious qustion, and one very difficult to decide.

Dupuy, of the veterinary school of Alfort, has made experiments on this subject. After the section of the eighth pair of nerves, the blood has been uncoagulated: the function of hæmatose being by this section disordered, may it not account for this result? Meyer, on the other hand, did not find its coagulability impeded by this section. Authors assert that a violent commotion of the spinal marrow has produced this condition of dissolution: persons struck by lightning have presented the same appearance of dissolution. An animal tired to death has his blood in a dissolved state; purpura hæmorrhagica, a disease in which the blood has been found dissolved, may develope itself independent of any of those causes which we have as yet examined. I believe that in former times the dissolution of the blood, owing to various causes, was more common than at present, as may be seen by the description of the blood by the old authors, and the diseases which then prevailed.

Consideration of the causes which tended to produce this condition of the blood.

In the middle ages they were much more numerous, the habitations of men being more crowded together, the circulation of pure air more impeded, and the individuals more closely packed together; at the same that the food was of a less wholesome quality, famine more frequent, the towns badly built, with narrow streets never visited by the sun, the supply of water deficient, noxious and impure in quality, &c. These sources of disease having been removed, we meet much more rarely in the present day, those diseases which produce the dissolution of the blood.

The writings of the 15th, 16th, and 17th centuries contain numbers of cases in which the blood was dissolved, or coagulated very imperfectly, and many diseases characterized by this condition of the blood, such as scurvy, spontaneous gangrene, and purpura, are much rarer at present. The typhus fever which raged in Ireland some years ago, presented many of the features of those diseases which are described as belonging to the middle ages, and which are rarely met with at present, owing to the improved condition of the people: their existence at the present day among the people of Ireland may be attributed to the events and poverty with which that unhappy people is afflicted, and which are not be paralleled in any other part of Europe.

The state of the dissolution of the blood produces symptoms resembling those of poisoning, and is very favourable to hæmorrhages: when the blood is merely in a liquid condition, dropsies but not hæmorrhages are produced: the secretions may be altered when the blood is dissolved, and tumefaction of the spleen is a very constant attendant in these cases. I do not think that the blood during life can pass into a state of putridity, such as has been described by old authors.

We have so far described all those alterations of the blood which are recognisable by our senses, and we shall next describe those which are revealed to us by the microscope.—*London Medical Gazette.*

On Penetrating Wounds of the Heart. By J. A. Jobert.—Three interesting cases of penetrating wounds of the heart are related, where the persons lived after the receipt of the injury from twelve hours to no less than ten days. In all the cases the wound of the heart was indicated by a peculiar whizzing sound, precisely similar to that which exists in varicose aneurism; and from its presence being recognised in all these three cases, M. Jobert thinks it might be regarded as a diagnostic mark of the presence of a penetrating wound of the heart. He relates several cases which have been published by other authors, where patients have lived for years after this organ had been wounded, opportunities having in many of these cases occurred, of confirming the diagnosis by examination after death. He regards, therefore, a wound of the heart as not necessarily fatal, and gives numerous directions of the mode in which the treatment may be best conducted. Of these, bleeding, both general and local, the local application of cold, and the administration of such remedies as tend to reduce the force of the circulation, and abate the tendency to hæmorrhage, are the chief.—*Archives Generales*, Sept. 1839.

Periodical Uterine Dropsy.—The patient was a married woman, 32 years of age, of lymphatic temperament, and her constitution impaired by hard work, bad food, and unhealthy residence. Every month she passed *per vaginum* from twenty-five to thirty pints of clear, limpid water, of a slight yellowish tinge, and for two days after a few drops of blood, deficient in colouring matter. After this evacuation she

was perfectly well; but another collection of water soon formed, of which she was sure to be relieved the following month. This condition had continued eight months before she was seen by Dr. Dubedat. She could assign no cause for the disease. It had come on without injury or sensible lesion of any kind, or alteration of their functions. The only change in her health was emaciation and general debility, which was daily increased. The abdomen was of extraordinary size, and there was considerable dyspnœa; the pulsations of the heart were regular; the digestion was bad; and the bowels were constipated. The urine was scanty, but paosed frequently, yet without pain; the pulse was feeble, slow, and contracted; the face was pale, as were also the tongue and gums; and there was considerable blueness around the eyes.

On examination, the body of the uterus was found to be much enlarged and infiltrated, yet light compared with its size; its neck was also infiltrated and shortened.

To relieve the constipation, castor oil was administered, followed by emollient enemata, and, as drink, barley-water with nitre.

The next day pains in the loins were felt, announcing that an evacuation of water was about to take place; and during that night water was discharged so abundantly as to inundate the bed.

Three days after the abdominal swelling was gone, the digestion had improved; her appetite returned; the pulse was more natural, and her menses had ceased.

She was put on a course of diuretics; nevertheless, in a fortnight the abdomen had enlarged, and continued to increase till again evacuated in the same manner, followed by the menstrual discharge; the quantity of water evacuated was, however, only about half what had come on the former occasion. The diuretic medicines were then given in increased doses, and afterwards followed by tonics, and under this treatment the watery discharges became less frequent and were diminished in quantity; the menstrual discharge, too, returned of a more natural appearance, and in a few months she was free from complaint.—*Bulletin General de Therapeutique*, May, 1838.

Mortality from Phthisis, at Naples.—In a late number of the Filiatre Sebizio, M. de Renzi controverts the conclusions concerning the mortality by phthisis, at Naples, to be found in a paper presented by M. Journé to the Academy of Medicine at Paris. The sum total of phthisical patients received into the Hospital of Incurables during the years 1835-36 and '37, is reduced by M. de Renzi from 2969 to 2775; and he shows that of this number only 1846 belonged to Naples and its suburbs, the rest consisting of strangers who come to die there.

This gives an average of 615 instead of 989, which was M. Journé's supposition—a considerable difference, particularly if the probabilities of medicine are to be based on figures. Then subtracting the catarrhal affections, or those which resemble phthisis, M. de Renzi fixes the number of phthisical patients at 600, which, in a population of 400,000, gives one in 666. We must add, however, 200 patients belonging to the middle and upper classes, which will make 800; and of these 560 die, or 70 per cent. But, as the ordinary mortality is 13,000, the proportion of deaths from phthisis is about 1 in 23.

The mean mortality at the Hospital of Incurables is 1800, and the number of deaths among the phthisical patients belonging to the town is 430; so that these deaths form a quarter of the total mortality in the institution. But if we consider, *first*, that at Paris more than a third of all patients are treated in the hospitals, and hardly a fifth at Naples; *secondly*, that at Paris, the number of consumptive patients received is equal to those suffering under other diseases, while at Naples the latter are much fewer in proportion, it will be allowed that a comparison is difficult. This being settled, if in the hospitals of Paris, as Bayle has demonstrated, and M. Journé laid down, one-third of the patients die of phthisis, and this number is more than a third of all the deaths in the whole town; if, on the other hand, in the hospitals at Naples, less than a quarter of the patients die by phthisis, and if, even adding the patients who do not belong to the town, we do not reach a third, as at Paris; if the phthisical patients in the hospital include nearly all in town, whilst the deaths in the hospital are but a sixth of the general mortality, it necessarily follows that the patients who die of phthisis are in proportion to those who die of other diseases, as 1 to 4 at Paris, and 1 to 12 at Naples. Hence the climate of Naples, far from favouring the development of the disease, makes it rarer than it would naturally be in a town of small size, relatively to its population, who are in consequence crowded. If we consider, moreover, that scrofulous affections are very common there, we must necessarily conclude, that the number of consumptive patients does not exceed the natural proportion to those afflicted with scrofula.

As to the important question, whether a phthisical patient from a cold or northern climate may experience benefit in a more temperate one, M. de Renzi answers it in the affirmative, and says he knows it from his own experience. But if the disease has already made great progress, if the disorganization of the lungs is much advanced, and the tubercles have begun to soften, a southern climate is of no avail. In such cases the poor patient travels but to perish on a foreign shore, far from his relatives and friends.

Gazette Medicale, Decem. 29, 1839.